

60130-1371  
00MRA0030**IN THE ABSTRACT:**

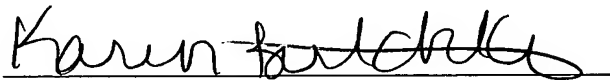
Please replace the abstract as follows:

all  
A vehicle door, consisting of an interior shell and a respective exterior shell defining an interior space of a door on both sides and further contains a frame structure, the lateral surfaces of the frame structure are covered by at least one of the interior shell and the respective exterior shell. In order to make this vehicle door comparatively lightweight but rigid while using parts of a window-regulator as structural parts of the vehicle door the frame structure consists at least in part of a profile bar, bent into a U-shape as viewed from the side and opening to the top of the vehicle door. Said profile bar is provided with guide elements for a window-regulator arrangement.

**REMARKS**

Applicant respectfully requests examination of this application.

Respectfully submitted,

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Dated: March 26, 2002

**VERSION WITH MARKINGS TO SHOW CHANGES MADE****SPECIFICATION**

Page 1, after the title and above line 1, please insert the following section heading:

**BACKGROUND OF THE INVENTION**

Amended page 2, line 7, please insert the following section heading:

**SUMMARY OF THE INVENTION**

Amended page 4 and page 5, please amend the paragraph bridging these pages as follows:

Inasmuch as the term "U-shaped-structure" is used, this means, in the sense of the invention, that this structure forms at least part of a frame structure 10 and a profile bar 10A is part of said U-shaped-structure at least at one of its sides. Said U-shaped-structure maybe completed to form a complete loop necessary. The U-shape may open toward any edge of the door but preferably opens to the top. The open edge maybe closed by a further profile bar or element, e.g. stamping, to form a completed loop. Said U-shaped-structure maybe formed in different ways, particularly by bending a profile bar into a U-shaped form; however, [he] the legs of the U-shape maybe connected together by a multiplicity of other elements (instead of a bended curve element), e.g. by other or same profiles, other stampings or moldings or die-castings, with appropriate fixings in the corner areas as required. The oblong profile used for the U-shaped-structure may also be discontinuous, particularly in the vicinity of the motor of a window-regulator or maybe jointed by one or several other elements which form the disconuity, e.g. a separate mounting plate, molding or die-casting fitted, which may joy discontinuous parts of the profiles together.

Page 5, line 14, please insert the following section heading:

**BRIEF DESCRIPTION OF THE DRAWINGS**

Amended page 6, line 21, please insert the following section heading:

**DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT**

Page 10, please amend the first full paragraph on lines 4 to 10 as follows:

Such a profile, as well as the profiles according to Figures 3 and 5, may have, at least partially, viewing surfaces in the vehicle door, so that a complete or partial profile trim panel can be omitted, which may be advantageous, particularly for the upper part of the frame serving as a window panel guide frame in the examples of a vehicle door shown in Figures 1A[,] and 6 [and 7], since side coverings of the frame structure as such are not absolutely necessary in this area.

Page 10, please amend the second full paragraph on lines 12-31 as follows:

In the embodiments according to Figures 3 and 5, it is possible to align the exterior surface of a window pane 22 with an exterior surface of the profile 10A, so that between the window pane 22 and the window frame 10, steps can be avoided which are disruptive visually and/or with respect to air flow. In the example according to Figure 5, the window pane 22 has toward the interior side a large contact surface with respect to the profile 10A which, not expressly shown in the drawing, can be used as a sealing surface; for example, for accommodating a sealing profile. A visually very advantageous window coupling with a pressure/traction element 20 is achieved in this example by means of a coupling member 24 which grips from outside through a slotted area of the guide element 16 into the profile 10A and there is connected with the pressure/traction element 20. An angular area of the coupling member 234, extending out of the guide element 16 parallel to the window 22, makes possible its connection with the window; for example, by gluing. Such a coupling member may be very short in the direction of movement, in particular, several such coupling members may be provided along the guide element 16. Advantages with respect to stability, however, are also possibly brought about by an oblong coupling member, extending along the guide element 16, which member is connected with the window pane 22 along a greater or even the entire length of the guide element of the window.

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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**CLAIMS**

Page 15, before the first claim, please insert the section heading:

--What is claimed is:--

60130-1371  
00MRA0030**VERSION WITH MARKINGS TO SHOW CHANGES MADE****ABSTRACT**

Please replace the abstract as follows:

A vehicle door, consisting of an interior shell and a respective exterior shell defining an interior space of a door on both sides and further contains a frame structure [(10)], the lateral surfaces of the frame structure [(10)] are covered by at least one of the interior shell and the respective exterior shell. In order to make this vehicle door comparatively lightweight but rigid while using parts of a window-regulator as structural parts of the vehicle door the frame structure consists at least in part of a profile bar [(10A)], bent into a U-shape as viewed from the side and opening to the top of the vehicle door. Said profile bar [(10A)] is provided with guide elements for a window-regulator arrangement.

Claims

- 5 1. Vehicle door, consisting of an interior shell (12) and a respective exterior shell (14) defining an interior space (26) of a door and further contains a frame structure (10); the lateral surfaces of the frame structure (10) are covered by at least one of the interior shell (12) and the respective exterior shell (14), characterized in that the frame structure (10) contains a profile bar (10A), forming at least part of a U-shaped structure as viewed from the side and opening towards an outer edge of the vehicle door<sup>x</sup> and that said profile bar (10A) is provided with *both* of the guide elements (16) for a window-regulator arrangement.
- 10 2. Vehicle door, in accordance with Claim 1, characterized in that said U-shaped structure is provided with a window-operating motor (18) or another window drive or adapted to receive such motor or drive.
- 15 3. Vehicle door, in accordance with Claim 2, characterized in that in the guide elements (16), drive cables, especially pressure and traction elements (20) of the window-regulator arrangement are integrated; said profile bar (10A) joins said motor or drive to a window pane (22) via said profile bar.
- 20 4. Vehicle door, in accordance with anyone of the Claims 1 to 3, characterized in that a raisable/lowerable window pane (22) is provided with coupling members (24) gripping into the guide elements (16).
- 25 5. Vehicle door, in accordance with Claim 4, characterized in that the coupling member (24) is glued to a window pane (22) of the door.
- x) , said u-shaped structure taking on at least a substantial part of the support and reinforcement function of the vehicle door,*

① < For another vehicle door the US-A- 5,907,897 discloses a conventional main door body made from inner and outer sheet metals connected by hemming to form a box with an upper slide for receiving the window panel together with the whole panel guide frame. Said box continues to take nearly the whole support and reinforcement function of said vehicle door. >  
mounting of such a vehicle door expensive and increases the weight of the vehicle door. ] < ① >

5 Based thereon, it is the problem of the invention to create a comparatively lightweight vehicle door from functionally suitable component parts. The number of structural components is to be reduced, if possible.

10 As a solution to this problem, a vehicle door with the characteristic of Claim 1 is proposed. Such a vehicle door has a frame structure which is covered at least on one of its sides with an inner or outer shell respectively, particularly panel elements; said frame structure consists at least in part of a profile bar, which forms at least part of a U-shaped structure as viewed from the side, for instance by bending said profile bar, and which U-shape opens towards an outer edge of the vehicle door, particularly to its top. Thereby, the U-shaped  
15 structure may take on at least a substantial part of the support and reinforcement function of the vehicle door. It may be closed to form a complete loop as well.

20 However the U-shaped structure does not only provide a high degree of stability, especially rigidity, of the vehicle door, for instance in the threshold area located at the lower edge of the door as well as its vertical and preferably parallel lateral extensions where it can accommodate the forces of the door hinges and of the door lock. The U-shaped structure - also - accommodates or even replaces essential components of a window opener arrangement -  
25 hereinafter called a window-regulator arrangement.

In a first embodiment, the two profile portions of an upright U extend approximately parallel and provide guide elements for a window-regulator arrangement, so that known slide elements can be completely omitted.  
30 Preferably, the U-shaped structure also accommodates a window-regulator drive; in particular, an electric motor. Furthermore, it can serve as guide



Furthermore, such a vehicle door simplifies the structural type and the mounting of important functional parts, such as window-regulator arrangements, door hinges and door lock, wherein the frame structure is in a better position than the known metal sheets <sup>< ② ></sup> or doors to carry out a dual function, thereby saving on structural components, weight and/or mounting costs.

② < (like known from US-A-5,907,897, mentioned above) >

Inasmuch as the term "frame structure" is used, this means, in the sense of the invention, that struts or strut-like structural components, leaving between them free spaces or openings, are connected with each other. The "oblong profiles," from which the frame structure formed, may be struts stamped from a plate, such as a metal sheet, and possibly additionally formed by a deep-drawing process; the struts being interconnected. The "oblong profiles" may be as well rods, at first in straight form and produced, for example, in an extrusion or continuous casting process, which are reshaped and/or joined by bending and/or by being connected with each other to form the desired frame structure. Such profiles, produced in the extrusion or continuous casting process, are also suited as frame elements for the vehicle door when they are provided as a support structure, especially in the A-, B- and/or C-column of the vehicle body, at least at one side of the vehicle door.

Inasmuch as the term "U-shaped-structure" is used, this means, in the sense of the invention, that this structure forms at least part of a frame structure 10 and a profile bar 10A is part of said U-shaped-structure at least at one of its sides. Said U-shaped-structure maybe completed to form a complete loop necessary. The U-shape may open toward any edge of the door but preferably opens to the top. The open edge maybe closed by a further profile bar or element, e.g. stamping, to form a completed loop. Said U-shaped-structure maybe formed in different ways, particularly by bending a profile bar into a U-shaped form; however, the legs of the U-shape maybe connected together by a multiplicity of

Figure 2 shows part of an U-shaped element for a frame structure, according to Figure 1A, with an alternative profile cross section in perspective view;

5 Figure 3 shows an alternative cross sectional form of an oblong profile with window-regulator guide element in cross section;

Figure 4 shows an alternative profile cross section with window guide element;

10 Figure 5 shows an additional alternative profile cross section with window guide element;

Figure 6 shows a vehicle door in schematic side view with a window-regulator drive;

15 ~~Figure 7 shows an alternative embodiment of a vehicle door in schematic side view with a window regulator drive and~~

20 Figure 8 shows an alternative embodiment of a frame structure with window guide element in horizontal cross section.

25 From Figures 1A to 1C, the three main components of a vehicle door in accordance with the invention can be gathered, namely a frame structure 10 (Figure 1A), formed from oblong profiles 10A to 10D, an external view of an interior shell or trim panel 12 (Figure 1B), wherein the interior shell covers the lateral surface of the frame structure 10 visible in Figure 1A, as well as an interior view of an exterior shell 14 (Figure 1C), wherein the exterior shell covers the lateral surface opposite the lateral surface visible in Figure 1A. A horizontal cross section along the line ID-ID in the lower area of the door can  
30 be seen in Figure 1D (profile 10B being deleted for clarity reasons).

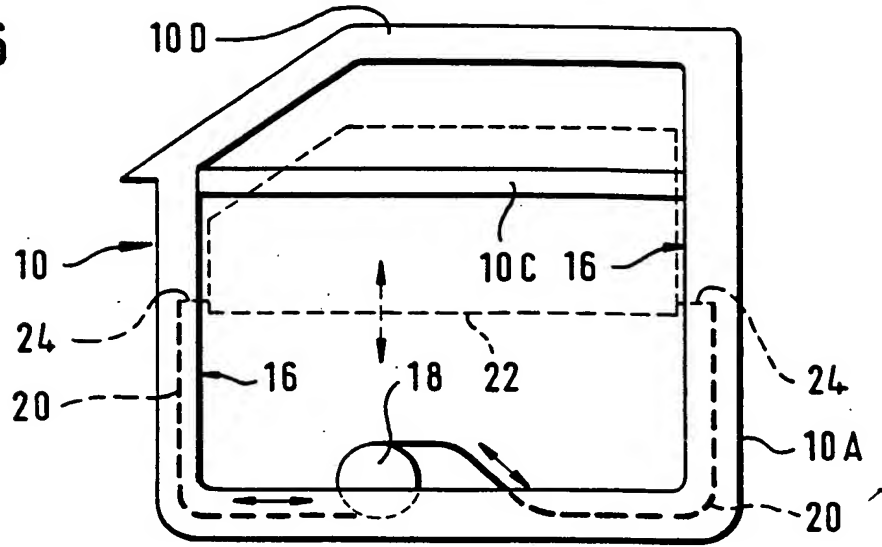
The frame structure 10, shown in Figure 1A, consists of a total of four profile sections 10A to 10D, produced in an extrusion process, with the cross section visible in Figure 2. The main component is a U-shaped profile bar 10A, formed by bending, which has parallel, approximately vertically extending lateral extensions and an approximately horizontally extending base extension and wherein a groove 16A surrounding a window-regulator guide element 16, visible in Figure 2, opens toward the interior curvature of the U-shape. The profile sections 10B to 10D, extending essentially diagonally, i.e. horizontally to diagonally, serve to reinforce the frame structure formed in the core of the U-shaped structural component 10A. They are connected with the U-shaped rod 10A in a rigid angle manner, for example, by welding or by any other known method.

*(other than in the US-A-5,907,897 as mentioned above)*

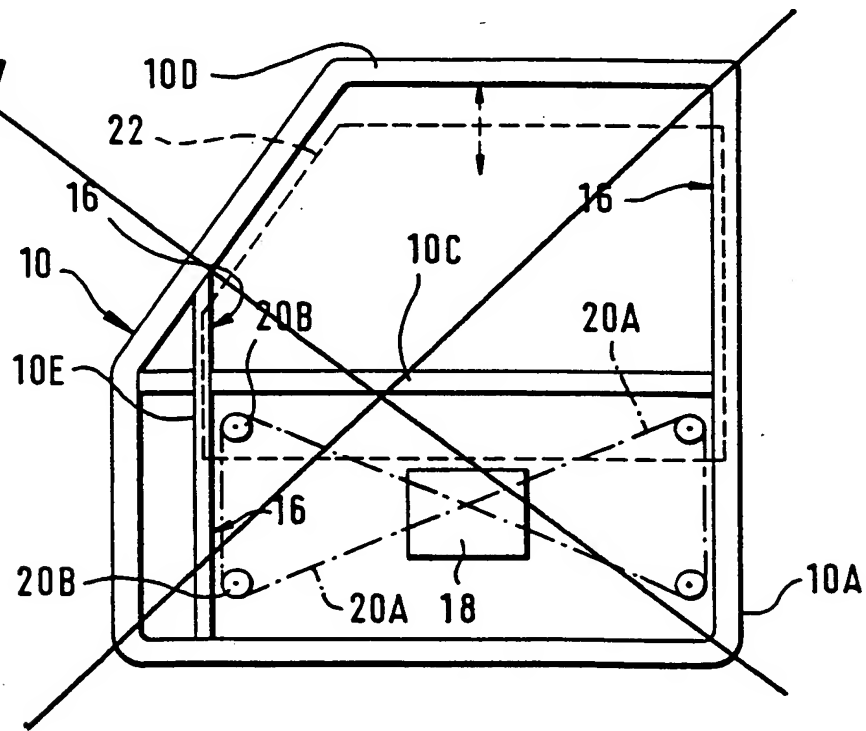
As a whole, the frame structure 10 represents the structural components determining the strength and the rigidity of the vehicle door. Therefore, it is possible to make relatively small demands regarding material selection and the strength of the interior shell 12 and the exterior shell 14. With respect to rigidity, they basically need only meet the requirements of the main function, which is to close off the interior space 26 of the door in an especially sealing manner and they must satisfy the requirements regarding the resistance to deformation and fatigue durability with respect to typical lateral stresses from the interior side of the vehicle or the exterior side of the vehicle.

While in the example according to Figures 1A to 2 the interior shell 12 already serves as an interior or trim panel of the vehicle door which, for example, is produced from a suitable non-metal, the interior covering of the frame structure 10 may, for example, also consist of a deep-drawn, so-called interior metal plate whose strength suffices for accommodating heavier or more greatly stressed functional components, particularly to serve as a pre-fabricated support module for a multitude of functional components, wherein an additional interior or trim panel satisfies the visual expectations and those regarding the

**Fig. 6**



~~Fig. 7~~



**Fig. 8**

